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PRESENTATION FLOW

- **Abstract**
- **Problem Definition/ Objective**
- **Introduction**
- **Literature Survey**
- **Theory (Proposed work/Implementation/Algorithm etc.)**
- **Results and Discussions**
- **Conclusion/Future Scope**
- **References**

ABSTRACT

Majority of IT labs in today's academic institutions face operational issues in the management of multiple systems simultaneously. The best example would be when a particular software needs to be installed in the labs, it becomes a tedious and time consuming process for the lab assistant to manually install the software in each and every system in the lab.

Also in some cases where the students forget to shutdown their respective computers, it becomes the responsibility of the lab assistant to shutdown the PCs manually. These challenges cause lack of access control and inadequate security. Moreover, there is lot of work pressure which leads to sub-optimal work schedules. To keep track of access records of the systems, we would also be designing a web-based GUI which records and displays the access information of PCs too.

PROBLEM DEFINITION

- In current university labs most of the administrative tasks are done manually which consumes lot of time and efforts. With the help of ansible framework and a proper supporting GUI, we can unleash and maximize the full potential of the servers and many of the current lab administrative problems can be resolved easily.

- The major drawback of the existing environements in the university labs is that its completely restricted within the scope of the lab instructors.Our architecture aims in automated installation and management of software packages.

- Ansible is originally only a command-line interface tool and thus it lacks an elegant user interface. Only a well versed user will be able to operate on a command line tool, which means a layman user will find it difficult to operate and run operational tasks effectively.

INTRODUCTION

- As we are using a free and open-source platform for our purpose, many labs can be automated using the same architecture at a very feasible price.
- Ansible provides the automation of IT infrastructure which includes – creation of virtualmachine, installation of new softwares, Docker containers
- We can configure our own cluster and make it up and running without any sort of human intervention. Ansible does its work like a professional if customized with proper facts and experience.
- Ansible works over SSH ensure that the target Machine or Server is accessible over SSH. It supports all type of SSH authentication.

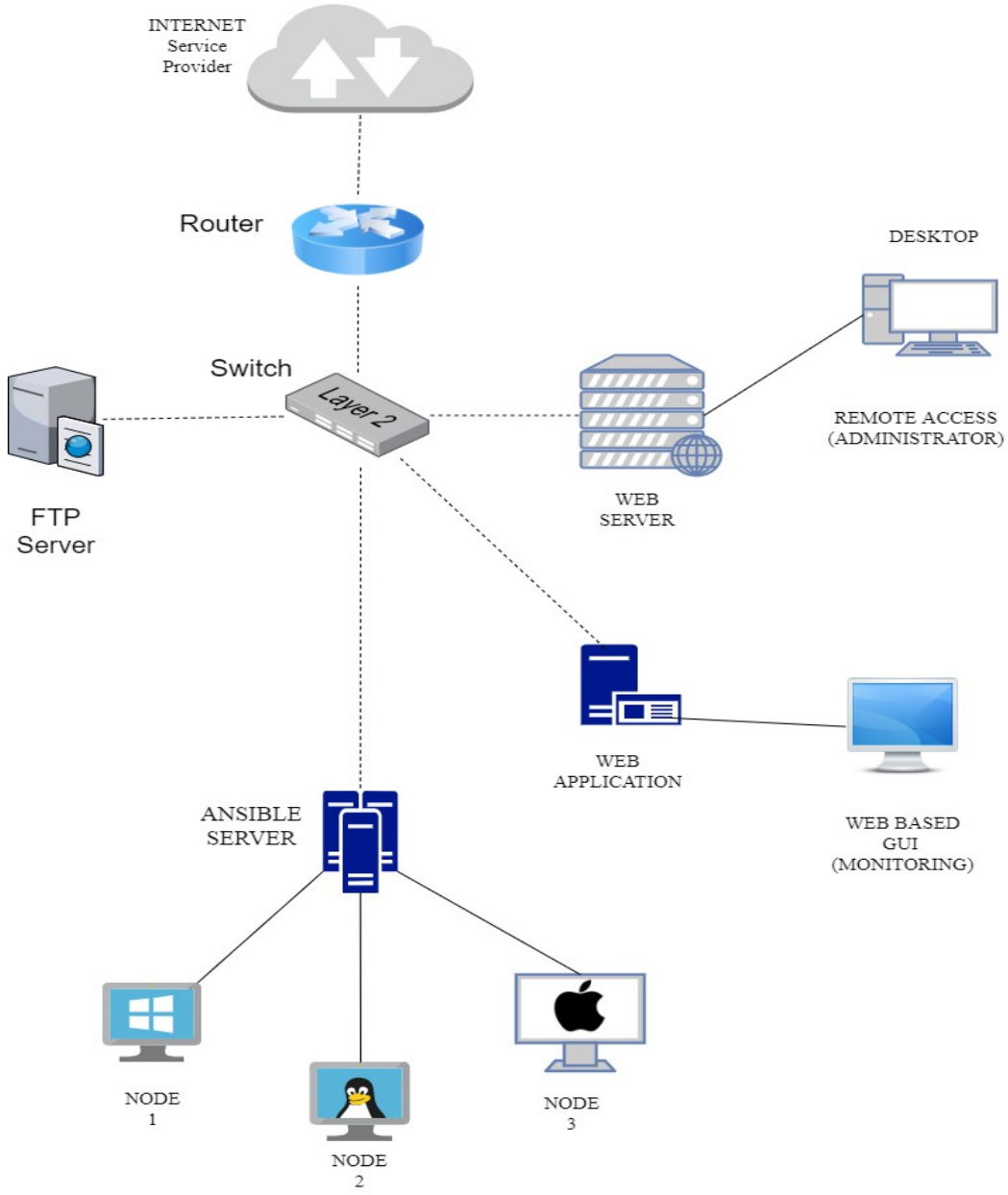
LITERATURE SURVEY

Sr No.	1
Title/Author	M. Balliauw and X. Decoster, "Automated Delivery," in Pro NuGet, pp. 179–214, Springer, 2013
Method used	Automation using Network interface and scripting
Advantage	Effective Package Management
Disadvantage	➢High Bandwidth Consumption ➢Client-Server node Failure leads to catastrophic issues.
Extracted Methodology	Dependency Management

Sr No.	2
Title/Author	D. Palma and T. Spatzier "Topology and orchestration specification for cloud applications (TOSCA)," 2015
Method used	Management using Cloud Computing With cloud based applications.
Advantage	Does not mandate the use of any specific security mechanism or technology
Disadvantage	Expensive Infrastructure and maintenance for small Areas.
Extracted Methodology	Security considerations

Sr No.	3
Title/Author	Pavel MasekMartin ŠtůsekJan Krejčí "Unleashing Full Potential of Ansible Framework: University Labs Administration " 2018
Method used	Ansible Framework
Advantage	Supports a variety of frameworks
Disadvantage	Limited to the capabilites of the Ansible framework
Extracted Methodology	Effective usage of Playbook in remote management

PROPOSED ARCHITECTURE



IMPLEMENTATION

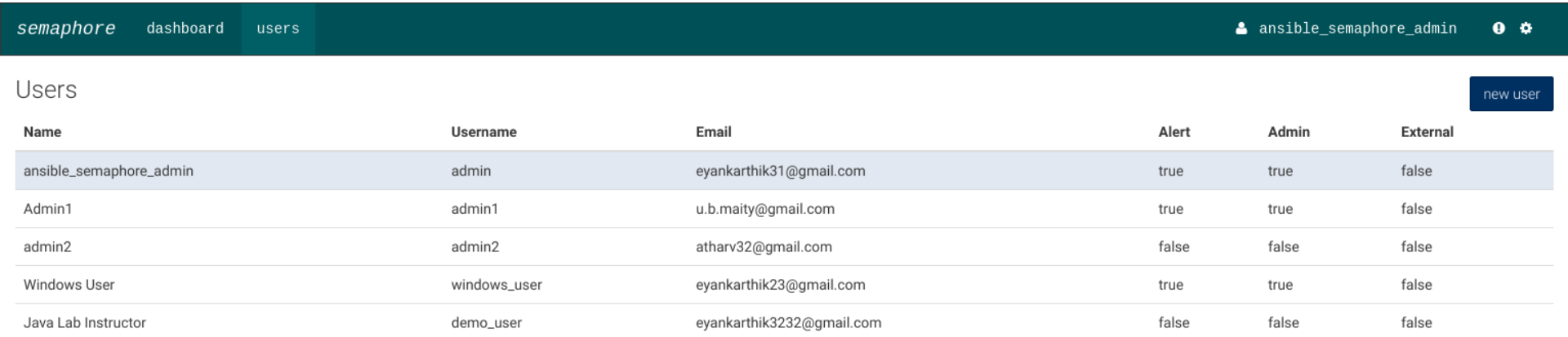
- Sample playbook for installing the essential set of tools for networking in a college Lab infrastructure

Open ▾ *networkingtools.yml /etc/ansible/yamlv1 Save

```
1 ---
2 # Installing All Essential tools for networking for lab 313
  ( Faster Process )
3 - hosts: client1
4   become: yes
5   become_method: sudo
6   tasks:
7
8   - name: Installing all essential Networking tools
9     apt:
10      name: "{{ item }}"
11    with_items:
12      - nmap
13      - iftop
14      - vnstat
15      - iptraf
16      - hping3
17      - dstat
18      - bmon
19      - tcpdump
20      - wireshark
```

Ansible login GUI for LAB instructors

User Manager for Admins



Name	Username	Email	Alert	Admin	External
ansible_semaphore_admin	admin	eyankarthik31@gmail.com	true	true	false
Admin1	admin1	u.b.maity@gmail.com	true	true	false
admin2	admin2	atharv32@gmail.com	false	false	false
Windows User	windows_user	eyankarthik23@gmail.com	true	true	false
Java Lab Instructor	demo_user	eyankarthik3232@gmail.com	false	false	false

Playbooks for different LABS

semaphore dashboard users — ansible_semaphore_admin

Autonetics of IT LABS

- Dashboard
- Task Templates
- Inventory
- Environment
- Key Store
- Playbook Repositories
- Team

Task Templates

new template

Alias	Playbook	SSH Key	Inventory	Environment	Repository	
Data Mining LAB	LAB405.yml	key	ansible_semaphore_inventory		apsitlabs	hide copy run
Git Installation	git.yml	key	ansible_semaphore_inventory		apsitlabs	hide copy run
Networking Lab	LAB302.yml	key	ansible_semaphore_inventory		apsitlabs	hide copy run
Python LAB	LAB317.yml	key	ansible_semaphore_inventory		apsitlabs	hide copy run
SDL Lab	LAB301.yml	key	ansible_semaphore_inventory		apsitlabs	hide copy run
Shutdown	shutdowns.yml	key	ansible_semaphore_inventory		apsitlabs	hide copy run
VMware LAB	LAB303.yml	key	ansible_semaphore_inventory		apsitlabs	hide copy run
Wireless Networking Lab	LAB313.yml	key	ansible_semaphore_inventory		apsitlabs	hide copy run

Inventory file

Edit Inventory

```
[client1]
ansadm@10.101.1.143
#[client2]
#ansadm@10.101.1.144

#ansible_ssh_common_args=' -o StrictHostKeyChecking=no'
```

cancel — save changes

SSH access keys

Update Access Key

Key Name: key

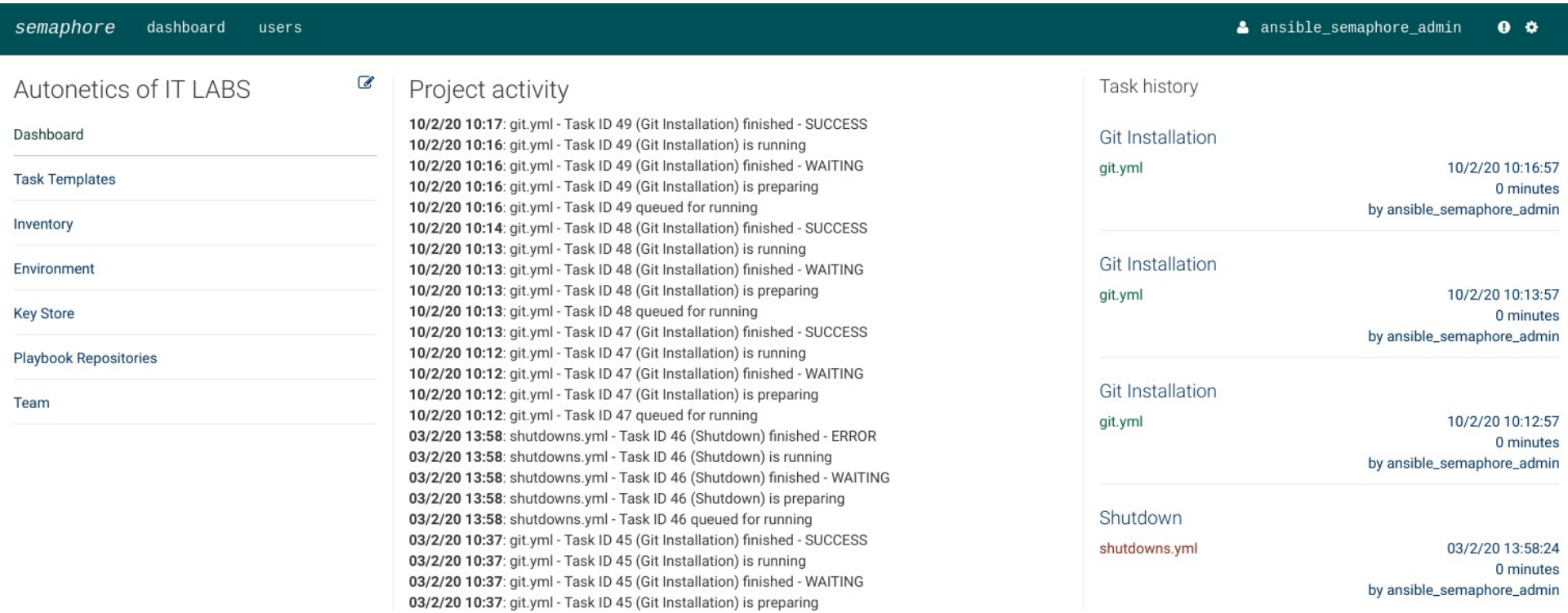
Key Type: SSH Key

Public Key:

```
ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAABAQC
pMdWz+ycHle9nZHNUuND4MQ7E9elMKR
LlviRz+fkDAJbc0VY118K3u3syt7JLPTxw8
NxHL4LebatkHoBk9CEvgqW3hqcrl0yvYjBU
YaMrlyK2N6n3yOEzqsQljpDqNAXqWAwfBr
ga3sobdcMdu7kH0DvLjyMPagzd8pu+VgvL
5WtOTggBTgvUCMxV4s2WdC5nnQll+ghrsp
orA+Dzntfz1L76DiV2tCicOr2UFhiYnxGxmLi
LJ7ASPquEif1YMjB7NN9sL8P3X9VapG5xq
v+MO/xexbRbWDhpfkrO9jWVgZePzJJe4ca
Sdwf/sNBOBCM0VzPa3ll9uJ/BVz55PYxB
apsit@ansadm
```

Public key is **optional** (unless you are using SSH certificates) however you should set it so you can identify your private key by its fingerprint. Private keys are not available for reading later from the UI.

Realtime Log generation



Fetching from Github Repository

Student Lab Utilization Record

APSIT LABS LOGIN

19204007

••••••••

Batch: B2

Lab No.: 317

Subject: NDL

SIGN IN

Forgot User name / password?

Centralized monitoring of lab utilization logs

UserID wise Records

Sr No.	Username	Batch	Subject	Lab No.	Date and Time(yyyy-mm--dd hh:mm:ss)
1	18101001	B1	ASL	317	2020-02-09 08:22:13
2	18101001	B1	AL	303	2019-09-28 13:59:48
3	18101001	B2	ASL	302	2019-09-22 14:19:36
4	18101001	B3	ASL	406	2019-09-22 14:18:43
5	18101001	B3	ASL	406	2019-09-22 14:17:22
6	18101001	B2	ASL	303	2019-09-22 14:10:06
7	18101001	B2	NDL	317	2019-09-22 14:07:59
8	18101001	B1	NDL	313	2019-09-22 14:06:20
9	18101001	B1	NDL	317	2019-09-22 14:04:53
10	18101001	B2	ISL	405	2019-10-29 16:18:19
11	18101001	B1	AL	303	2019-09-28 14:01:08
12	18101001	B1	AL	303	2019-09-28 14:07:00

CONCLUSION

The main motive of our work is to create a trustworthy, efficient and real-time system for administration of IT labs in universities. Now all the administrative tasks inside the lab can be executed at a very minimal time and effort with our system. The overall purpose was to minimize the efforts and ensure rapid deliveries of the needed softwares through automation. These objectives have been checked successfully and we hope to enhance the system furthermore and increase the advancements in our system. Thus we are making an effort to implement this system in the current university labs and modernize the IT labs methodically.

FUTURE SCOPE

- **Integration of IOT** : We plan to inetegrate IOT interfaces in our system for controlling all the electrical applicances throughout the lab remotely.

- **Using Docker containers** for easy deployment of applications in real time

- **Enhancing the Security :** Providing real time log generation to the system administrators for moderating the student's usage during exams or placements.

REFERENCES

[1] Xavier Decoster and Maarten Balliauw"Automated Delivery in Pro Nuget" October 2016.

[2] D.Palma and T.Spatzier. December 2016 "Topology and orchestration specification for cloud applications (TOSCA) " November 2013

[3] Pavel MasekMartin and ŠtůsekJan Krejčí, "Unleashing Full Potential of ansible Framework: University Labs Administration" May 2018

[4] Nishant Kumar Singh , Amity University, "Automated Provisioning of Application" January 2016

[5] J.O.Benson, J. J. Prevost, P. Rad, "Survey of automated software deployment for computational and engineering research," in System Conference (Sys Con), 2016 Annual IEEE, pp.1–6, IEEE, 2016.